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CURRENT LITERATURE

BOOK REVIEWS

Fertilization

The problem of fertilization has been studied chiefly by morphologists, who have limited themselves rather strictly to the structures concerned, and consequently a book by a prominent investigator,¹ dealing primarily with the physiological aspects of the case, cannot fail to be interesting and helpful. While the physiological standpoint is everywhere in evidence, the morphology is fairly presented, and the general conclusions, based upon both physiology and morphology, are suggestive.

Fortunately, NĚMEC does not confine himself to fertilization as usually defined, but devotes a large share of his attention to nuclear and cell phenomena in vegetative tissues, where he believes such phenomena may be of value in interpreting the process of fertilization. In this connection he discusses multinucleate cells, fusions in such cells, karyomere-formation, and the effect of chloral hydrate and chloroform upon cells and nuclei. Some attention is given to the behavior of nuclei in wound tissue, and to the influence of plasmolysis upon nuclear and cell division. Interesting chapters deal with the development of the chromosome and reconstruction of the nucleus, and with the influence of external factors upon the form of the chromosome. There is also a chapter upon the microchemistry of the nucleus and mitotic figure. These are the principal features of the first, or special part of the book.

The second, or general part, may seem to cover the whole field of cytology, but a glance at the chapter headings shows that the wide range of matter is pertinent and emphasizes the breadth of the subject. The headings are: the persistence and individuality of the chromosome; the relation between the size of nuclei and cells; the position of the nucleus; vegetative and sexual nuclear fusions; the reduction of chromosomes; the significance of chromosome numbers in alternation of generations; the nucleus as the bearer of hereditary characters; the nature of fertilization; and the individuality of the cell in the tissue.

Space would hardly permit a discussion of all these fundamental problems, but a mere statement of NĚMEC's position may be of interest. He believes that the hypothesis of the individuality of the chromosome offers the best explanation of the known facts, and suggests that the individuality may yet be demonstrated, perhaps by microchemical methods. Further, the number

¹NĚMEC, B., *Das Problem der Befruchtungsvorgänge und andere cytologische Fragen*. 8vo. pp. 532. *pls. 5. figs. 119*. Berlin: Gebrüder Borntraeger. 1910. *M*20.

of chromosomes (*ceteris paribus*) regulates the size of the nucleus and furnishes the best evidence for the individuality hypothesis. Nuclear fusion and reduction of chromosomes are regarded as important autoregulative processes which take place only under definite internal and external conditions. Although admitting that the nucleus is of great importance in transmitting hereditary characters, he does not believe that it is the sole bearer of such characters, but that this function is performed by the nucleus and cytoplasm together.

It is fortunate that physiological methods are being brought to bear upon morphological and cytological problems. The morphologist, with his limited knowledge of physiology, is necessarily one-sided in his methods and conclusions; the physiologist, with a correspondingly limited knowledge of structures and development, brings other methods and other viewpoints to the solution of the problem; and thus each corrects and stimulates the other, so that problems which either could not solve alone become possible. The strict morphologist and cytologist will find in this book much with which he cannot agree, but nevertheless he will be compelled to recognize it as a valuable contribution to the subject.—CHARLES J. CHAMBERLAIN.

Response to light

MAST² has written a thoroughly interesting book on the response of organisms to light. It consists of four parts: "Introduction and historical review" (pp. 1-57); "Experimental observations and discussions bearing on the question as to how organisms (especially those without eyes) bend or turn and move toward or from a source of stimulation" (pp. 59-235); "General considerations of reactions to light" (pp. 236-298); and "Reaction in light of different wave-lengths or colors" (pp. 304-393). A bibliography of 14 pages cites the more important literature on the subject, and frequent and excellent summaries make the main conclusions readily accessible.

The work brings together our knowledge of the response to light in plants, motile and sessile, and in animals, protozoa and metazoa. It is a consideration of response to light from the evolutionary point of view. MAST says, "the generality of the treatment of the subject of actions in organisms, including plants as well as animals, it is hoped will make the work of value to all students of nature, especially to those interested in comparative psychology, zoology, botany, and physiology."

Much of the second part is a statement of the author's own research. His work was mainly with animals, yet he has made contributions to plant response. He takes up the long discussed question as to whether directive response to light is determined by the direction of the rays or by the difference of intensity on different flanks. He uses the maize seedling with apparatus that apparently answers all the objections to former methods. His results

² MAST, S. O., *Light and the behavior of organisms*. 8vo. pp. xi+410. figs. 35. New York and London: John Wiley and Sons. 1911.